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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM J. DOMINO, SCOTT A. GRIFFITH, and
DMITRIY ROZENBLIT

Appeal 2010-002517
Application 09/621,407
Technology Center 2600

Before ALLEN R. MacDONALD, KALYAN K. DESHPANDE, and
JASON V. MORGAN, *Administrative Patent Judges*.

MORGAN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Introduction

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's non-final rejection of claims 1 – 8 and 11 – 23. Claims 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Ans. 10. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

Invention

The invention relates to a system and apparatus for data transmission that allows a direct conversion receiver and transmitter to be used without the shielding or offset circuitry for a direct current component in the received signal that is normally required for such direct conversion receivers and transmitters. Spec. 1, ll. 15 – 22. The direct-conversion receiver includes one or more subharmonic local oscillator mixers. A local oscillator is connected to the direct conversion receiver and generates a signal having a frequency equal to a subharmonic of a carrier frequency signal. Abstract.

Exemplary Claims

1. A system for transmitting and receiving data comprising:

> a direct-conversion receiver receiving a signal modulated on a carrier frequency signal, the direct-conversion receiver further *comprising one or more subharmonic local oscillator mixers*;

a local oscillator coupled to the direct conversion receiver, *the local oscillator generating a signal having a frequency equal to a subharmonic of the carrier frequency signal*; and

a transmitter coupled to the local oscillator.

(Emphases added).

5. The system of claim 1 further comprising a frequency multiplier coupled between the local oscillator and the transmitter, *wherein the frequency multiplier increases the frequency of the oscillator*.

(Emphasis added).

8. The system of claim 1 *wherein the transmitter comprises*:

an in-phase/ quadrature modulator coupled to the local oscillator, receiving an in-phase modulation input signal and a quadrature phase shift keyed signal modulated at the local oscillator frequency; and

a frequency multiplier coupled phase/quadrature modulator and multiplying the quadrature phase shift keyed signal.

(Emphasis added).

16. The method of claim 11 wherein modulating the outgoing data signal with the subharmonic local oscillator signal comprises:

frequency modulating the subharmonic local oscillator signal during a transmit cycle; and

interrupting *frequency modulation* of the subharmonic local oscillator signal during a receive cycle.

(Emphases added).

21. The system of claim 20 further comprising a general purpose computing platform coupled to the first mixer, the second mixer, and the modulator, the general purpose computing platform decoding an incoming data signal from the

> in-phase incoming data signal and the quadrature phase incoming data signal, and generating the outgoing data signal.
>
> 23. The system of claim 20 wherein an antenna is *directly connected* to the low noise amplifier, and the low noise amplifier is directly connected to the one or more subharmonic local oscillator mixers.

(Emphases added).

Rejection

The Examiner rejects claims 1 – 8 and 11 – 23 under 35 U.S.C. § 102(e) as being anticipated by Rozenblit (US 6,658,237 B1; Dec. 2, 2003; filed Aug. 31, 1999). Ans. 3 – 10.

ISSUES

Whether the Examiner erred in finding that Rozenblit discloses:

(1) a "local oscillator generating a signal having a frequency equal to a subharmonic of the carrier frequency signal" and "subharmonic local oscillator mixers" of the direct-conversion receiver, as recited in claim 1;

(2) "wherein the frequency multiplier increases the frequency of the oscillator," as recited in claim 5;

(3) elements of the claimed transmitter, as recited in claim 8;

(4) frequency modulating and modulation, as recited in claim 16;

(5) "a general purpose computing platform coupled to the first mixer, the second mixer, and the modulator, the general purpose computing platform decoding an incoming data signal from the in-phase incoming data signal and the quadrature phase incoming data signal, and generating the outgoing data signal," as recited in claim 21; and

(6) "wherein an antenna is directly connected to the low noise amplifier, and the low noise amplifier is directly connected to the one or more subharmonic local oscillator mixers," as recited in claim 23.

ANALYSIS

Claim 1

Claim 1 recites a "local oscillator generating a signal having a frequency equal to a subharmonic of the carrier frequency signal." Appellants argue "the local oscillator of Rozenblit does not generate a signal having a frequency equal to a subharmonic of the carrier frequency signal, but rather a range [of] frequencies that are many time[s] greater than any of the carrier frequency signals of Rozenblit." App. Br. 13 – 14. The Examiner disagrees, finding that Rozenblit describes "directly converting the signal to a baseband signal using a first signal derived from a local oscillator signal, the first signal being an nth subharmonic of the channel frequency, wherein n is an integer greater than 1." Ans. 12.

Rozenblit describes a local oscillator 311, comprising a voltage-controlled oscillator (VCO) 518, "configured to provide an output signal having a frequency . . . generally equal to about 1/2 of the GSM [Groupe Speciale Mobile] receive band or about 1/4 of the DCS [Digital Cellular Service] receive band." *See Rozenblit* 19:14 – 27. Therefore, we agree with the Examiner that Rozenblit discloses a local oscillator generating a signal having a frequency equal to a subharmonic (i.e., one-half or one-fourth) of the carrier frequency signal (of the GSM or DCS receive band).

Claim 1 further recites the direct-conversion receiver "comprising one or more subharmonic local oscillator mixers." Appellants argue that Rozenblit's "mixers 522 and 523 are not sub-harmonic mixers." App. Br. 14.

However, mixers 522 and 523 both accept LO input derived from VCO 18 (i.e., they both accept as input a signal having a frequency equal to a subharmonic of the carrier frequency signal). *See Rozenblit* 20:8 – 12. Appellants do not persuasively distinguish mixers that accept input having a subharmonic frequency and "subharmonic local oscillator mixers." Therefore, we agree with the Examiner that Rozenblit's mixers 522 and 523 fall within a reasonably broad interpretation of the claimed sub-harmonic mixers. *See* Ans. 12; *see also Rozenblit* Fig. 8; Spec. Fig. 1.

Accordingly, we sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 1, and of claims 2 – 4, 7, 11 – 15, 19, 20, and 22, which are not argued separately with specificity. *See* App. Br. 15 – 20.

Claim 5

Claim 5 recites "wherein the frequency multiplier increases the frequency of the oscillator." Appellants argue that Rozenblit discloses "that the amplitude multipliers are switched at twice the frequency of the local oscillator frequency, but that is simply not what is recited by claim 5." App. Br. 15 – 16. However, Appellants do not persuasively distinguish between switching at twice the frequency and increasing the frequency. In both cases, the frequency is increased (e.g., doubled). Appellants further submit that Rozenblit discloses that "a signal at the frequency of the multiplication factor is not actually produced as a signal at a pin or node of the mixer." App. Br. 16 (citing *Rozenblit* 16:15 – 26). However, Claim 5 is silent as to what the frequency multiplier does after increasing the frequency. Therefore, we agree with the Examiner that Rozenblit discloses the claimed frequency multiplier. *See* Ans. 5.

Accordingly, we sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 5, and of claim 6, which is not argued separately with specificity. *See* App. Br. 15 – 16.

Claim 8

Claim 8 depends on independent claim 1 and defines elements of the claimed transmitter. The Examiner finds that these elements are disclosed by Rozenblit. *See* Ans. 5 – 6 (citing *Rozenblit* 19:50 – 20:57, and 23:15 – 22). Appellants argue that the cited sections "discuss only the ***receiver*** of Rozenblit, not the ***transmitter***, and the Examiner cites to no section of Rozenblit that relates to the transmitter for the associated claim elements." App. Br. 17 (emphasis in the original). However, the relied upon disclosures of Rozenblit include a description of a frequency translator 531 which provides a carrier input to quadrature modulator 301. *See Rozenblit* 20:37 – 38. Quadrature modulator 301 comprises mixers 500 and 501, which receive I and Q components of a baseband signal ***to be transmitted***. *See Rozenblit* 20:48-53. Thus, contrary to Appellants' arguments, the Examiner has cited to a description in Rozenblit related to transmitting, as opposed to receiving, components in Rozenblit. Therefore, we agree with the Examiner that Rozenblit discloses the additional transmitter elements recited in claim 8. *See* Ans. 5 – 6.

Accordingly, we sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 8.

Claim 16

Claim 16 recites steps of a method related to "frequency modulating the subharmonic local oscillator signal" and "interrupting frequency modulation." Appellants submit that, in the withdrawn rejection of claim 10,

the Examiner admitted "that Rozenblit fails to disclose that the modulator is a frequency modulator, so it is simply impossible, per the Examiner's own admission, for Rozenblit to disclose the method of claim 16." App. Br. 18. However, in rejecting claim 10, the Examiner relied on columns 22 and 23 of Rozenblit to describe the modulator structure of claim 10. *See* Non-Fin. Rej. 9 (citing *Rozenblit* 22:65 – 23:22). To describe the steps of claim 16 related to modulating, the Examiner relies on columns 16 through 19. *See* Ans. 8 (citing *Rozenblit* 16:65 – 17:20, 18:11 – 50, and 18:65 – 19:35). Appellants do not provide persuasive evidence or arguments showing that the Examiner's characterization of the disclosures of columns 22 and 23 pertain to the relied-upon disclosures of columns 16 through 19. Therefore, Appellants' arguments are not responsive to, and not persuasive of error in, the Examiner's rejection of claim 16. *See* Ans. 7 – 8.

Accordingly, we sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 16, and of claims 17 and 18, which are not argued separately with specificity. *See* App. Br. 18 – 19.

Claim 21

Claim 21 recites "a general purpose computing platform coupled to the first mixer, the second mixer, and the modulator, the general purpose computing platform decoding an incoming data signal from the in-phase incoming data signal and the quadrature phase incoming data signal, and generating the outgoing data signal." Appellants argue that Rozenblit fails to disclose the claimed general purpose computing platform. *See* App. Br. 20.

The Examiner cites to Figure 8 and column 20 of Rozenblit to describe the disputed recitations. However, the Examiner provides insufficient evidence that these disclosures are directed to the use of a

general purpose computing platform as claimed. *See* Ans. 10. Therefore, we agree with Appellants that the Examiner erred.

Accordingly, we do not sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 21.

Claim 23

Claim 23 recites "wherein an antenna is *directly connected* to the low noise amplifier, and the low noise amplifier is *directly connected* to the one or more subharmonic local oscillator mixers" (emphases added). Appellants argue that "[t]he elements relied on by the Examiner as allegedly showing this direct connection are clearly not directly connected." App. Br. 20. However, neither Appellants nor the Specification clearly define "directly connected."

Rozenblit discloses that "a signal is received from antenna 307 and bandlimited by bandpass fillter [sic] 308 so that is limited to the selected band. *The signal* is amplified by LNA [low noise amplifier] 309 and then input to DCR [direct conversion receiver] 310." *Rozenblit* 18:31 – 34 (emphasis added). The only processing done to the signal between antenna 307 and LNA 309 is selecting a band. The signal itself is provided from the antenna to the LNA. Because the processing, isolating the selected band, is minimal, Rozenblit's connection between antenna 307 and LNA 309 falls within a broad, but reasonable interpretation of "directly connected."

Rozenblit also shows a filter 521 between LNA 309a and mixers 522 and 523. *See Rozenblit* Fig. 8 and 22:22 – 23. However, this filter merely suppresses the effects of any leakage between the LO and RF inputs of mixers 522 and 523. *Id.* Such suppression is not directed to effecting significant change in the signal between LNA 309 and mixers 522 and 523.

Thus, Rozenblit's connection between LNA 309a and mixers 522 and 523 also falls within a broad, but reasonable interpretation of "directly connected." Therefore, we agree with the Examiner that Rozenblit discloses the claimed direct connections. *See* Ans. 10.

Accordingly, we sustain the Examiner's 35 U.S.C. § 102(e) rejection of claim 23.

DECISION

The Examiner's decision to reject claims 1 – 8, 11 – 20, 22, and 23 under 35 U.S.C. § 102(e) is affirmed.

The Examiner's decision to reject claim 21 under 35 U.S.C. § 103(a) is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

In the event of further prosecution, we recommend that the Examiner ascertain whether the recitations of claim 21 would be unpatentable under 35 U.S.C. § 103(a). Specifically, we recommend that the Examiner ascertain whether the coupling of a general purpose computing platform to the claimed system would have been obvious.

AFFIRMED-IN-PART

ELD